Model 926S

Chloride Analyser

Operator's Manual

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G:\DOCUMENT CONTROL\Manuals\Chloride\926S\92691005 Sherwood M926S mk2 operators manual Iss.10.doc

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1

Introduction

1.1 Introduction

The M926S is a direct reading, digital chloride meter. It is designed for fast and accurate determinations of chloride levels in industrial samples.
Sample volume is selectable at 100µl or 20µl and results are displayed on a digital readout in mmol/l (millimoles per litre) Chloride.

This manual presents complete instructions for setting up and using the M926S. A short time spent familiarising yourself with these instructions will be more than repaid in satisfactory operation.

The M926S is intended for use by persons knowledgeable in safe laboratory practices. If the M926S is not used in accordance with these instructions for use, the protection provided by the equipment may be impaired.

A Service Manual is available as an optional extra, for use by appropriately qualified technical personnel. Please refer to Section 10.

1.2 Summary of the Test

The Sherwood Model 926S is used for the determination of chloride ions. It is an instrumental analogue of ”Argentimetry”, the traditional titrimetric methods using Silver Nitrate reagent. Like these classic methods it relies on the chemical formation of the very insoluble salt, Silver Chloride. The importance of chloride determination has been realised for well over a century, with many variations and changes being made to the techniques in order to improve the detectability and selectivity. Research into the analysis of chloride was conducted by Gay-Lussac (1832), Levol (1853), Mohr (1856) and Volhard (1874) and their findings have proven to be the basis of the methods, which are still in common use today.

1.3 Reagents

The following Sherwood Scientific solutions are recommended for use with the M926S. Ordering information is given in Section 10.2.

NOTE All reagents contain preservatives where required.

Standard Solution is 100mmol/l Cl as Sodium Chloride.

Combined Acid Buffer Solution is a support electrolyte consisting of a mixture of Acetic and Nitric acids which maintain the correct pH for the complete cycle of titrations, and a colloid to prevent precipitation.

WARNING Acid Buffer is corrosive – avoid contact with skin. Wash exposed areas with water.

Dilution

No dilution is required for Sherwood Scientific reagents.

Storage

Solutions should be stored away from direct sunlight in a cool place, preferably with an ambient temperature below +25°C (+77°C). Do not use solutions after the expiration date shown on the bottle. Do not return decanted contents to the original bottle.

Purification

No purification or treatment is required when using Sherwood Scientific reagents.

Instability

Never leave bottles of Standard Solution uncapped, as prolonged exposure to the atmosphere will affect the solutions concentration.

2

Installation

2.1 Services Required

An a.c. supply at 100V, 200V, 220V or 240V ±10%, at 50 to 60Hz, is required for the M926S. The voltage is preset during manufacture and the value is shown on the serial plate attached to the instrument.

CAUTION If the voltage setting is not correct for the local supply, please contact your Sherwood Scientific distributor.

2.2 Unpacking

Upon receipt, the M926S should be removed from its carton and inspected for damage. Contact your Sherwood Scientific representative if any items are missing or damaged.

1. Lift out the accessory tray.
2. Lift the instrument out of the polythene cover on to a bench.
3. Check the instrument and all the items in the carton for signs of damage. Check items received against the following list and notify your Sherwood Scientific representative if any discrepancies are discovered.

IMPORTANT Quantities shown in the following list are those supplied with a new instrument. DO not re-order from this list; instead refer to Section 10 of this manual.

Part No.	Description	Quantity	
001 48 154	Fuse, 160mA, antisurge (for spares use)	2	(230V units)
001 48 153	Fuse, 315mA, antisurge (for spares use)	2	(115V units)
001 42 498	Supply lead a.c.	1	
001 56 202	Chloride Standard Solution, 100mmol/l Cl, 6 x 100ml	1 pack	
001 56 205	Silver Electrode Polish	1 vial	
001 56 208	Combined Acid Buffer Solution, 1 x 500ml	1 bottle	
925 11 002	1 x Cathode, 2 x Detecting Electrodes, set of 3	1 set	
925 11 003	Anodes, pack of 3	1 pack	
926 11 001	Beaker, plastic, graduated at 10ml, Sherwood	2	
925 14 001	Stirrer	1	
	Chloride Meter	1	
926 09 051	Lead, M926 to Printer/Computer	1	
926 91 005	Operators Manual	1	

2.3 Assembly

CAUTION Check the voltage shown on the serial label. If it is not correct for the local supply, contact your Sherwood Scientific distributor.

1. Fit the two shorter, sleeved electrodes into the two rear positions on the underside of the electrode head, item 3, figure 2.1. Ensure both electrodes are pushed firmly into their sockets behind the protective rubber boots.

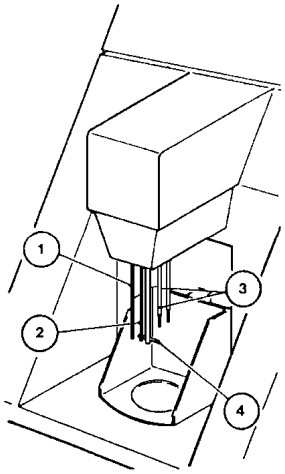

Figure 2.1 Electrode Head

1. Cathode, 2. Anode, 3. Sense electrodes, 4. Stirrer.

2. Insert the stirrer through the stirrer hole and push it firmly into its coupling, as shown in figure 2.1, item 4.

3. Insert the cathode (unsleeved short electrode) through the lefthand hole and push it firmly into its socket, as shown in figure 2.1, item 2.

4. Fit an anode (70mm long electrode) through the remaining hole into its socket.

5. Check that the three shorter electrodes are all fully inserted, and then adjust the position of the anode so that all four electrodes are the same length.

6. Position the M926S so that there is clear access to the mains supply switch.

7. Where necessary, fit a suitable plug to the a.c. supply lead. Follow the plug manufacturers instructions.

8. Refer to Section 5 of this manual for detailed operating instructions.

3

Principles of Operation

3.1 Description

An accurately measured volume of sample (100µl or 20µl, set by the range button on the front panel) is added to an acid buffer. The M926S automatically titrates chloride ions by passing a known constant current between two silver electrodes, which provides a constant generation of silver ions. These silver ions combine with the chloride in the sample and form silver chloride, which is held in suspension by the colloid stabiliser. During the titration period the digital readout is updated approximately every 0.3 seconds. During these periods the number of silver ions introduced into the sample combine with one unit measurement of chloride. When all the chloride has been precipitated as silver chloride, free silver ions begin to appear and the solution conductivity changes. This change is detected by the sensing electrodes and the readout is stopped, displaying the results directly in millimoles per litre. Another sample may now be added to the same acid buffer and the cycle repeated. The digital display is held until starting another cycle, when it is automatically reset to zero.

4
Performance Characteristics and Specifications

4.1 Range

10 to 299mmol/l Cl.

4.2 Accuracy

Results will be within ±2mol/l (at the 100mmol/l level) of the values obtained by standard wet-chemical methods after allowing for pipetting errors.

4.3 Linearity

Results will be within ±1mmol/l in the range 10 to 299mmol/l or ±1% concentration value, whichever is the greater.

4.4 Reproducibility

The values obtained from twenty consecutive titrations of a nominal 100mmol/l solution will give a coefficient of variance of 1.5% or less.

4.5 Stability

The calibration level (mean of five titrations of a standard solution) will change by less than ±2 Least Significant Digits over the life of any silver anode.

4.6 Response Time

A stable reading will be displayed within 26 seconds of depressing the 'Titrate' button, at a concentration level of 100mmol/l.

4.7 Measurement Capacity

Twenty samples at 100µl or 20µl volume, per reagent change.

4.8 Samples

Type

Chloride in solution, having low ionic strength, neutral pH and free of silver halides, silver reactive constituents (other than chloride), solid mater and high levels of dissolved solids.

Presentation

By pipette directly into the beaker of reagents.

Volume

100µl or 20µl

Performance Characteristics and Specifications
continued

4.9 Readout

Three digit LED display, reading up to 299. For definitions of the display codes refer to Section 5.1 of this manual.

4.10 Warm Up

Five minutes warm up is required to meet the stated specification.

4.11 Environmental Conditions

Operation

Temperature range	+10°C to +35°C
Maximum relative humidity	85% at +35°C (non condensing)

Transportation

Temperature range	-40°C to + 45°C
Maximum relative humidity	95% at +45°C

Compliance with the stated specification will be unaffected by a change in ambient temperature up to 4°C per hour, provided the operating temperature range is not exceeded.

Installation Category

Installation category 1.

4.12 Power requirements

Voltage

An a.c. supply at 100V, 115V, 200V, 220V or 240V ±10%, 50 to 60Hz.

NOTE If you have a 230V supply, use the 240V setting.

Power

Fuse rating	220V/240V	2 x 160mA
	100V/115V/200V	2 x 315mA
VA rating		10 Volt Amperes.

4.13 Size

Width	200 mm (7")
Depth	250mm (9.8")
Height	315mm (12.4")

4.14 Weight

3.8kg (8.4lbs).

5

Operating Instructions

5.1 Controls and Indicators

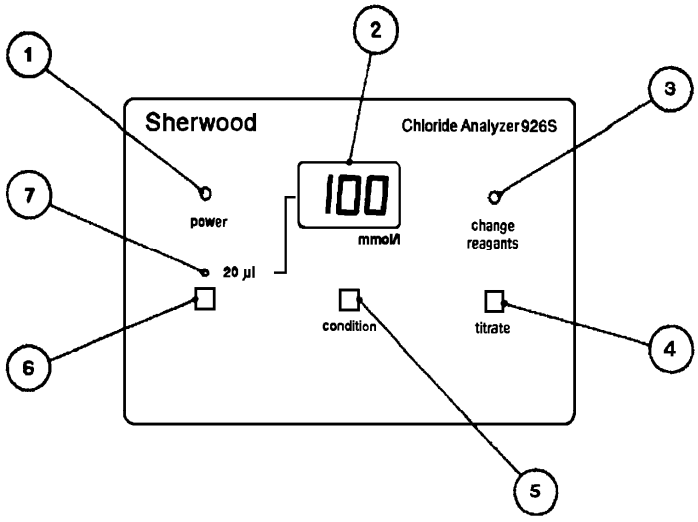

Figure 5.1 Front Panel

1. Power indicator, 2. Digital readout, 3. Change reagents indicator,
4. Titrate pushbutton, 5. Condition pushbutton, 6. Range pushbutton,
7. 20µl LED indicator.

Condition

Pushbutton that when depressed initiates the conditioning cycle. The conditioning cycle must be run each time the M926S is switched on and each time the reagents are changed. The purpose of the conditioning cycle is to Titrate out any chloride present in the reagents or beaker, so that the subsequent titration is accurate. The '*condition*' pushbutton also resets the sample number counter, which controls the '*change reagents*' LED indicator and the E02 error code.

Titrate

This pushbutton, when depressed, initiates a titration cycle. During a titration the stirrer operates for approximately 5 seconds before the readout is set to zero. The chloride is then titrated out of the solution while the readout is incremented. When all the chloride is titrated the readout is stopped and held. The 'titrate' pushbutton is inoperative following switch on and after an E02 error code is displayed. In each case this ensures that a condition cycle is carried out first. This prevents an erroneous result on the first titration due to chloride being present in the reagents or beaker.

Operating Instructions

5.1 Controls and Indicators

continued

Range

This pushbutton selects the volume of sample to be measured, either 100µl or 20µl. The M926S carries out measurements in units of mmol/l Cl. Make sure that the LED indicator is illuminated by depressing the button to read 20µl samples.

Power

Green LED indicator that is illuminated when the M926S is connected to an a.c. supply and the on/off power switch on the rear panel in on.

Change Reagents

Yellow LED indicator that is illuminated when twenty samples have been titrated. A further two samples can be titrated, if required, before changing the reagents.

Display Codes

The following display codes will appear on the digital readout in place of the measured value.

Code	Indication
CCC	A condition cycle is in progress.
E01	The display has counted past 299.
E02	Reagents must be renewed. Initiated when a twenty third titration is attempted after a conditioning cycle, no titration will take place.
E03	No sample present.
EEE	[In RS232 mode], External device not connected or not switched on.

Calibrate Control

The calibration control is accessible via a hole in the righthand side panel. The calibrate control determines the speed at which the display is updated and, therefore, the final result. The adjustment procedure is detailed in Section 8.4.

5.2 Rear Panel Components

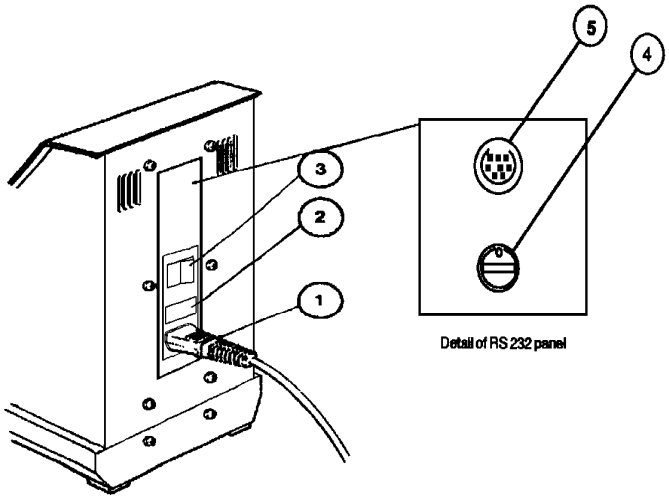

Figure 5.2 Rear Panel

IEC symbol advising user to refer to accompanying documentation.

1. **Power** Input a.c. power supply connector.

2. **Fuses** Two 160mA (230V) or Two 315mA (115V) fuses to protect the M926S. Both live and neutral are fused.

3. **Power switch** On/Off rocker switch that switches the a.c. line and neutral supplies to the instrument. Part of mains inlet.

4. **RS232 communications switch** Your M926S has an RS232 output fitted and this switch is used to provide the different output 'handshakes'. See Section 5.5.1.

5 **RS232 socket** Input connector for Serial Cable (926 09 051)

Operating Instructions
Rear Panel Components
continued

5.3 Calibration

Calibration has to be carried out separately for both 100µl and 20µl sample sizes. The procedure is the same except for the selection of sample size by the range button, the use off appropriate sample size and its respective calibration control.
The instructions below are for 20µl sample and settings.

1. Connect the M926S to an a.c. supply and switch on the rear panel power switch. Check that: -
   - 'power', '20µl' and 'change reagents' indicators are illuminated.
   - all digits on the readout are displayed in sequence from 000 through to 999.

2. Check that 'change reagents' and '20µl' indicators are off when readout returns to 000.

3. The software version of the RS232 fitted to your instrument will be indicated during the power on sequence. e.g. 033 is version 0.33. See Section 5.5.4.

NOTE All three electrodes go black in use, this is normal and will not affect performance.

4. Depress 'range' button to illuminate '20µl' indicator.

5. Add Combined cid Buffer to the mark in a clean sample beaker.

6. When the M926S has been switched on for 5 minutes, continue with the calibration.

7. Place the sample beaker on the platform and raise the platform, until it locates in the raised position.

8. Pipette 20µl of 100mmol/l Standard Solution into the beaker.

9. Depress 'condition' pushbutton.

10. Immediately CCC will be displayed on the readout, indicating that conditioning is in progress.

11. When the stirrer stops, pipette 20µl of 100mmol/l Standard in to the beaker.

12. Depress 'titrate' pushbutton.

13. Check that 'range' indicator is on and the reading is 100 ±2. If reading is satisfactory, continue with Section 5.4, Operation. If E01 is displayed (reading above 299) check that the pipette is dispensing 20µl. If the reading is outside the specification, repeat from paragraph 11. If the second reading is not within the stated range, but is reproducible to ±3 refer to Section 8.4 and recalibrate the instrument. If it is not reproducible, refer to Section 9, Troubleshooting.

14. If you are using a printer or computer with your M926S then the result of the calibration will be printed as e.g. Sample 001 = 100mmol/l. (All values appearing on the display will be printed as Sample… in sequential order even though they may be standards. See Section 5.5.3.

5.4 Operation

WARNING Do not attempt sample determinations unless the calibration procedure detailed in Section 5.3 has been successfully carried out.

1. Keeping the electrodes immersed, ensure that the '20µl' LED is illuminated (LED off for 100µl), pipette the 20µl (100µl if selected) of sample into the beaker and depress the 'titrate' pushbutton.

2. When the stirrer stops, note the reading on the display.

3. Repeat paragraphs 1 and 2 for further samples.

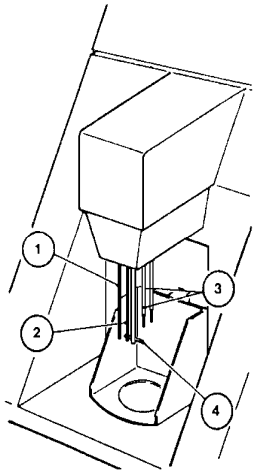

Figure 5.3 Electrodes and Electrode Head.

1. Cathode, 2. Anode, 3. Sense electrodes, 4. Stirrer.

4. When the 'change reagents' indicator comes on, you will have titrated 20 samples. If only two further samples are to be run, continue with paragraphs 1 and 2. However, if more than two samples are to be run, continue with paragraph 6.

IMPORTANT If a third sample is added after 'change reagents' is illuminated it will be lost as code E02 will be displayed.

5. If code E02 is displayed continue with paragraph 6.

6. Lower beaker and empty out contents. Rinse with deionised water and dry with clean tissue.

7. If necessary, adjust the vertical position of the anode, item 1, figure 5.3, so that it is the same length as the other electrodes.

8. Continue as detailed in Section 5.3, paragraph 3.

9. When determinations are complete, remove the beaker and allow the electrodes to dry naturally.

Operating Instructions
Operation
continued

5.5 RS232 Output, Printing and BlueNotes

The M926S has been improved with the addition of an RS232 output, which enables results to be sent to external printers, such as the Sherwood Portable Printer (473 56 903); the new BlueNotes Package (926 86 309); or other devices with serial inputs.

1. The communications switch (see figure 5.2, item 4) must be set to one of the following positions

   0 No external device in operation or connected.
   1 RS232 in use and cable connected to external device.

2. If you wish to use an external device then insert the small end of the Serial Cable (926 09 051) into the socket on the rear of the M926S (figure 5.2, item 5); insert the 9way plug at the other end of the serial cable into the serial input socket of the external device, a printer, the marked input on the Datagate Intelligent Interface or a computer serial interface.

3. **Set the baud rate for the external device to 9600**.

4. **Direct printing from the Model 926S.**
   Switch on the external device then switch on the M926S. The power up sequence contains the software version, which is indicated in the third set of displays as e.g. 033, which is version 0.33. The printer will print '926S Analyser (V0.33)'.

   If the communication switch is set '1' and an external device is not connected or is not switched on then the error message 'EEE' alternates with '000' after the initial sequence is finished.

5. Perform the calibration and measurement as described in Sections 5.3 and 5.4. After each titration the printer will print the value displayed as: -
   'Sample 001 = 100mmol/l'
   'Sample 002 = 102mmol/l'

   During and after the conditioning there is no signal to the printer, as conditioning can be necessary during the measurement run of samples, the number sequence is thus interrupted.

   The number sequence on a printer can be reset to '001' only by switching off the M926S and reconditioning.

5.6 BlueNotes Package

BlueNotes is a new system enabling the automatic transfer of data via Bluetooth from the M926 and a balance to a computer program which does all the calculations and prepares the final report. When used correctly it will ensure good laboratory practice, reduce transcript errors and improve efficiency.

For further detailed information contact your Sherwood Scientific distributor.

6

Operating Precautions and Hazards

6.1 Operating Precautions

1. The electrodes will go black during use; this will not affect the performance. Only if the M926S will not measure a Standard or sample will it be necessary to clean the electrodes.

2. The M926S requires a warm up period of five minutes to meet the stated specification.

3. Reproducibly accurate results are dependent on reproducible pipetting from sample to sample and from aqueous standard to sample. If the M926S is calibrated on an aqueous standard and reproducibly low results are obtained with samples, hold up in the pipette should be suspected and a rinse out technique employed.

4. Always dispense standard solution into a small beaker or cup. Do not take standard solution directly from the bottle with a pipette, as the standard could become contaminated. Never pour standard solution back into the bottle once it has been dispensed. Ensure that only genuine Sherwood Scientific reagents and supplies are used with the M926S. Do not use solutions after the expiry date shown on the bottle.

5. Samples should have low ionic strength, neutral pH and be free of sulphide, sulphydryl silver halides, silver reactive substances (other than chloride), solid matter and high levels of dissolved solids.

6. Do not leave the electrodes immersed in reagents when the instrument is not in use.

7. Use only the beakers supplied with the M926S.

8. It is recommended laboratory practice to wear gloves when handling samples. Gloves will also afford protection against the Combined Acid Buffer and against accidental static damage to the electrodes.

6.2 Hazards

1. All electrical equipment is potentially hazardous. Never remove covers from the M926S without first ensuring that it is isolated from the a.c. supply.

2. Do not move the M926S when there is a beaker containing Combined Acid Buffer in position on the sample platform.

7

Quality Control

7.1 General

The M926S Chloride Analyser has been designed to provide fast and accurate determinations of chloride in industrial solutions.

The latest Sherwood Scientific technology has been incorporated into the M926S to ensure the validity of the final results. However, the results can be affected by factors other than instrument malfunction, such a sample handling and storage. Sherwood Scientific recommend therefore, that a Quality Control programme is set up to monitor instrument and operator performance. Because the needs of each laboratory are different, due to size of workload, number of hours worked, statutory regulations, etc., no attempt has been made to formulate a rigid programme. Instead, in Section 7.2 there are a number of suggestions that will be helpful in specifying a procedure to suit your particular requirements.

The following references are recommended for further information on Quality Control.

Pearson, E.S., British Standard 600:1935.
Westgard, J.O., Carey, R.N., and Wold, S., Clinical Chemistry 20'825 (1974).
Barnett, R.N., American Journal of Clinical Pathology, 50,671 (1968).
Tonks, D B., Canadian Journal of Medical Technology, 30,38 (1968).
Natrella, M.G., Experimental Statistics, National Bureau of Standards Handbook 91, U.S. Government Printing Office, Washington D.C., 1963, pp4.1 to 4.7 and Table A-21, p T-36.

IMPORTANT If you report your results to a Quality Control Scheme ensure that they are informed of the change in method, i.e. Sherwood Scientific 926S Chloride Analyser.

7.2 Quality Control Checks

The following notes are designed to assist you in formulating a Quality Control programme.

1. Include a Quality Control at least once every 40 samples, following the recommendations of the QC Manufacture.

2. Check abnormally high and low values daily.

3. Routinely include aqueous Standards that contain chloride concentrations that are different to the Standard concentration used for calibrating the M926S.

4. Ensure day-to-day variations do not exceed acceptable values.

5. Reproducibility should be checked on 20 replicate samples on a routine basis.

8

Maintenance

8.1 General

The M926S has been designed to reduce the need for regular maintenance to an absolute minimum. The maintenance required is detailed in Section 8.2, Daily. Refer to Section 10 for ordering information and catalogue numbers of parts used for daily maintenance, which are listed under *Equipment Required*.

It is recommended that at the end of the warranty period, the customer opens a Maintenance Contract with Sherwood Scientific. This contract is designed to keep your instrument in first class condition by ensuring that all operating systems are routinely checked and adjusted. Further details of the Maintenance Contract Scheme can be obtained from your Sherwood Scientific Representative.

8.2 Daily

Equipment Required

Disinfectant Solution e.g. glutaraldehyde,
electrode polish,
1 x anode,
1 x cathode,
2 x detecting electrodes.

1. Check that all four electrodes are straight and parallel and the anode is the same level as the other electrodes. If necessary, refer to Section 8.3 to clean, adjust or replace the electrodes.
2. Wipe down the sample area with disinfectant solution.

8.3 Electrode Cleaning and Replacement

Equipment Required

Electrode polish, soft cloth, 1 x cathode, 1 x anode and 2 x detecting electrode.

1. Remove the four electrodes by withdrawing them downwards from the electrode head.

Note that the anode (item 1, figure 8.1) is longer than the other three electrodes.

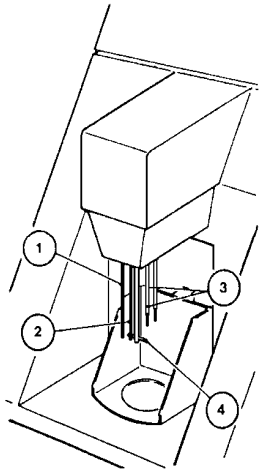

Figure 8.1 Electrodes and Electrode Head

1. Cathode, 2. Anode, 3. Sense electrodes, 4. Stirrer.

2. If the length of the anode is less than 57mm discard it and fit a replacement.

3. Place a little Sherwood Scientific Electrode Polish on a soft cloth and gently rub the exposed parts of the electrodes until they are clean and bright.

4. Refit the electrodes; ensure that with the cathode and sense electrodes fully inserted, the anode is adjusted to the same length.

5. Place a beaker of deionised water on the sample lift and immerse the electrodes.

6. Carry out three condition cycles.

7. Remove the beaker and wipe the electrodes with a clean soft cloth.

8. Carefully inspect the electrodes to ensure that they are clean. If they are not repeat paragraphs 1 to 7. If they are still not clean fit replacements, ensuring that they are fully inserted.

9. Check that all the electrodes are straight and parallel, adjusting as necessary.

10. Calibrate the instrument as detailed in Section 8.4.

8.4 Calibration Procedure

Equipment Required

100µl or 20µl pipette, 100mmol/l Cl Standard Solution, Combined Acid Buffer, Insulated flat blade screwdriver (3mm (⅛")).

1. Refer to Section 5.3 and carry out paragraphs 1 to 11.

2. Carry out five titration's using 100mmol/l Cl Standard Solution, noting each reading. If the five readings are not reproducible to within ±2, refer to Section 9, Troubleshooting.

3. Calculate the mean of the five readings, which should be between 99.5 and 100.5mmol/l. If it is, then no further action is required. If not continue with paragraph 4.

4. Using a screwdriver adjust the *count adjust* control through the hole in the side panel, item 1, figure 8.2. If the reading is low adjust the control clockwise, if high adjust the control counter-clockwise. The sensitivity is approximately a change of 8mmol/l for one complete rotation.

NOTE The Sherwood Scientific Model 926S uses an absolute method of operation and is calibrated at the factory. Recalibration should only be necessary after changing internal electronic components.

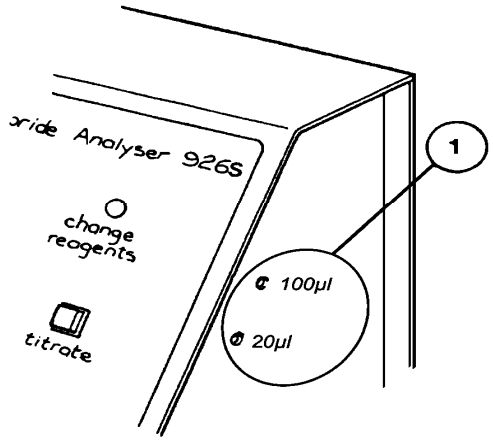

Figure 8.2 Calibrate Control

1. Count adjust controls.
   100µl above
   20µl below

5. Repeat paragraphs 2 to 4 until the mean result is within the range 99.5 to 100.5.

9

Troubleshooting

9.1 Error Codes

E01 The instrument has counted past 299. Check the pipette is dispensing the correct volume, 100µl or 20µl.

E02 Twenty two samples have been run. Change the reagents.

E03 No sample present.

EEE (In RS232 mode), External device not connected or not switched on.

9.2 Power LED not illuminated.

Check that the instrument is connected to a working a.c. supply, and that the power switch is in the on position.

Check the plug fuse and replace if necessary. Check the instrument fuses and replace if required, refer to Section 5.2.

If the fault persists contact your Sherwood Scientific distributor.

9.3 Condition or titrate cycle inoperative.

Check the beaker contains chloride; add 0.1ml of standard solution if necessary.

Clean or replace the electrodes, refer to Section 8.3.

Make sure that the cathode electrode is fully inserted into its socket.

If the fault persists contact your Sherwood Scientific distributor.

9.4 Reproducibly high or low results

Recalibrate the M926S, refer to Section 8.4. If necessary, using a fresh bottle of standard solution and another pipette.

Check that carry over in the pipetting is avoided by using a rinse out technique for each sample.

If the fault persists contact your Sherwood Scientific distributor.

9.5 Non-reproducible results.

The M926S requires a five minute warm up to meet the stated specification.

Try another pipette. (Ensure the pipette is reproducible to 0.5% Standard Deviation).

Clean or replace the electrodes, refer to Section 8.3.

Use a fresh bottle of Combined Acid Buffer.

If the fault persists contact your Sherwood Scientific distributor.

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Spares and Accessories

10.1 Ordering Information

When ordering spares or accessories for the M926S, please give the following information to your Sherwood Scientific representative; -

Serial number
Catalogue number of part (Cat. No.)
Description
Quantity required

This will ensure that your order is dealt with quickly and efficiently.

The number shown in the third column (Quantity) is the quantity of items that are supplied against the stated catalogue number. If the quantity is greater than one, then only multiples of that quantity can be supplied.

10.2 Spares and Accessories.

Cat. No.	Description	Quantity
001 56 208	Chloride Analyser Combined Acid Buffer, 1 x 500ml	1 bottle
001 56 202	Chloride Analyser Standard, 100mmol/l Cl, 6 x 100ml	1 pack
001 56 205	Silver Electrode Polish, 25g	1 vial
001 48 052	Fuse 150mA antisurge	1 up to s/n 12410
001 48 154	Fuse 160mA antisurge (for 230V instruments)	1 from s/n 12411
001 48 153	Fuse 315mA antisurge (for 115V instruments)	1 from s/n 12411
473 56 903	Printer Assembly, Universal	1
473 59 700	Printer consumables kit	1 pack
926 09 051	Lead, M926 to Printer/Computer	1
925 11 002	1 x cathode and 2 x detecting electrodes, set of 3	1 set
925 11 003	Anodes, pack of 3	1 pack
926 11 001	Beaker, plastic, graduated at 10ml, Sherwood	1
925 14 001	Stirrer, 20mm	1
925 89 001	Service manual	1
926 86 309	BlueNotes Package	1

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Sherwood Scientific Limited
Product Warranty Statement

Warranty Term: 12 Months

Sherwood Scientific Ltd (Sherwood) warrants, subject to the conditions itemised within this document, through either Sherwood personnel or personnel of its authorised distributors, to repair or replace free of all charges, including labour, any part of this product which fails within the warranty time specified above, appertaining to this particular product. Such failure must have occurred because of a defect in material or workmanship and not have occurred as a result of operation of the product other than in accordance with procedures described in the instructions furnished with this product.

Conditions and specific exceptions that apply to the above statement are as follows:

1. End-user warranty time commences on the date of the delivery of product to end-user premises.

2. '*Free of all charges*' statement applies only in areas recognised by Sherwood as being serviced either directly by its own personnel, or indirectly through personnel of an authorised distributor. Products purchased outside these areas requiring service during the warranty period will incur charges relative to the travel/transit costs involved. However, products purchased in such areas will be serviced during the warranty period free of all charges providing they are returned, carriage paid, to either Sherwood or by pre-arrangement to an authorised Sherwood distributor.

3. All maintenance (other than operator maintenance as described in the instructions), repairs or modifications have been made by Sherwood or Sherwood authorised personnel.

4. This product has where applicable been operated using Sherwood specified supplies and reagents.

5. Sherwood reserves the right to make any changes in the design or construction of future products of this type at any time, without incurring any obligation to make any changes whatsoever to this particular product.

6. Reagents, supplies, consumables, accessories and user maintenance items are not included in this warranty.

Product Warranty Statement (continued)

7. Repairs or replacement of any part failing due to abnormal conditions including the following, are excluded from this warranty:
    a. Flood, lightning, earthquake, tornado, hurricane, or any other natural or man-made disaster.
    b. Fire, bombing, armed conflict, malicious mischief or sprinkler damage.
    c. Physical abuse, misuse, sabotage or electrical surge.
    d. Damage incurred in moving the product to another location.

User agrees to permit Sherwood personnel or personnel of its authorised distributor to make changes in the product which do not affect results obtained, but do improve product reliability.

Representations and warranties purporting to be on behalf of Sherwood made by any person, including distributors and representatives of Sherwood, which are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitations of the liability of Sherwood as set forth above), shall not be binding upon Sherwood unless reduced to writing and approved by an officer of Sherwood Scientific Ltd.

Except for the obligations specifically set forth in this warranty statement, in no event shall Sherwood be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort or any other legal theory and whether advised of the possibility of such damages.

Neither Sherwood nor any of its third party suppliers makes any other warranty of any kind, whether expressed or implied, with respect to Sherwood Products.

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